

(No Model.)

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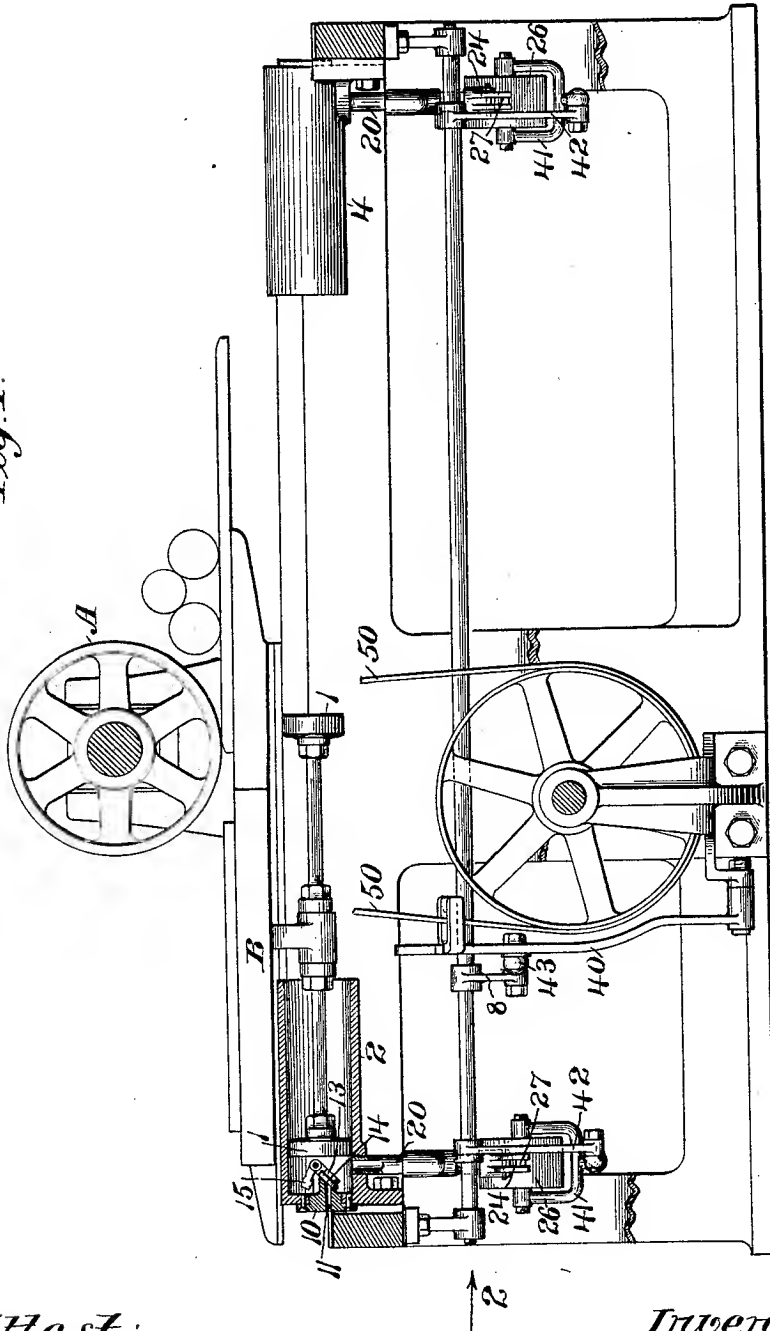
T. M. NORTH.

AIR CUSHIONING DEVICE FOR PRINTING PRESSES.

No. 600,164.

Patented Mar. 8, 1898

Fig. 1.



Attest:
S. Smith
A. New

Inventor:
Thomas M. North
by Phelps, Munson & Phelps
attys.

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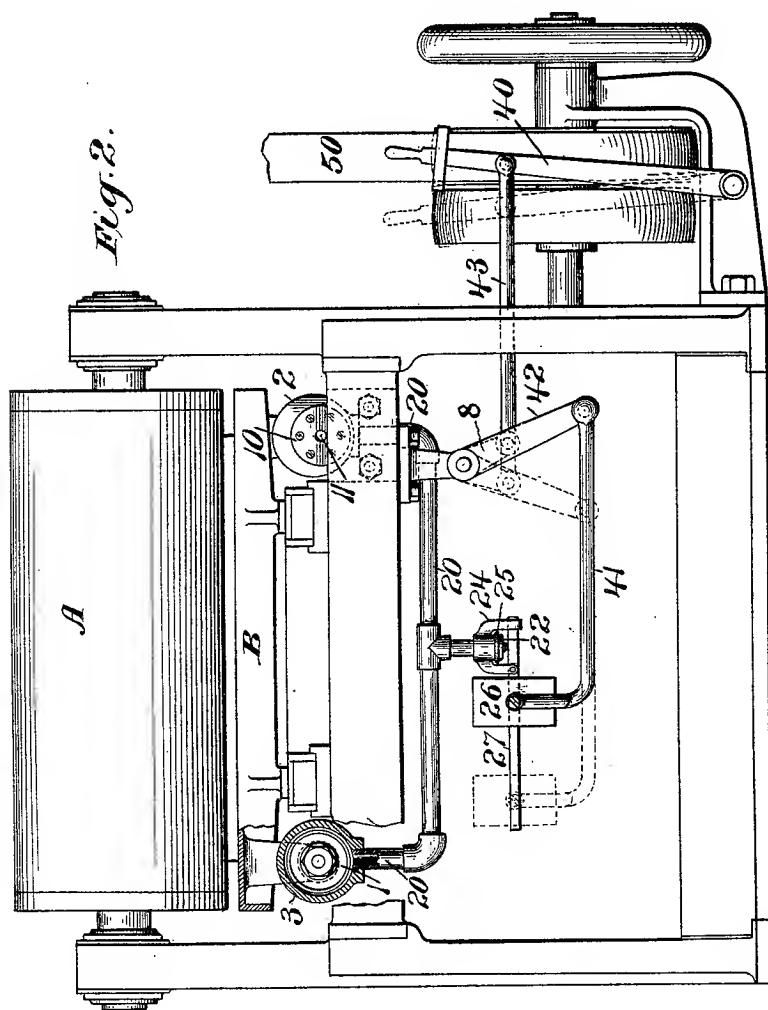
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Attest:
S. Winthall
A. Kew.

Inventor:
Thomas M. North
By Philip Munson & Phelps
attys

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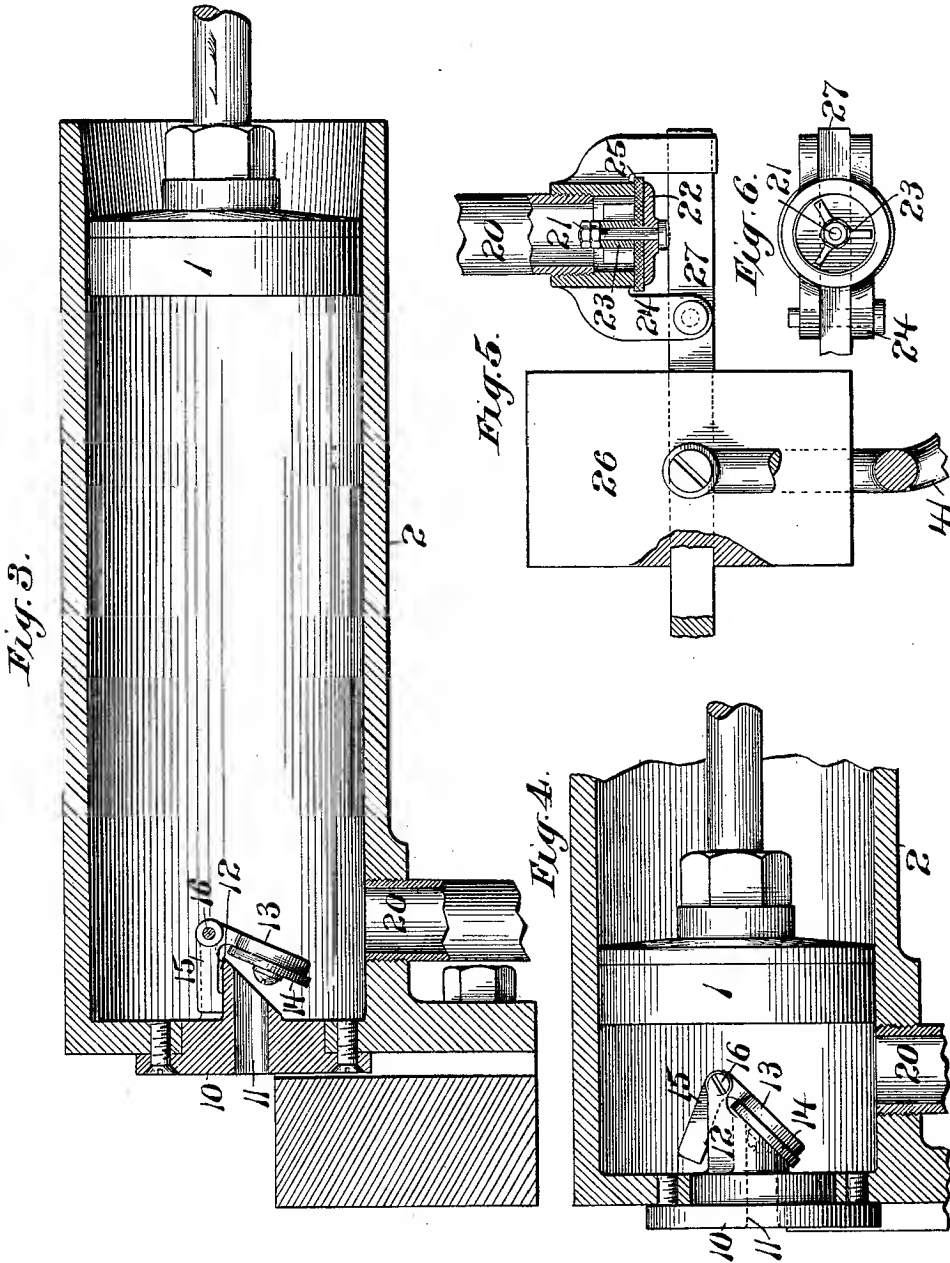
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S. Smith
A. Kew.

Inventor:
Thomas M. North
J. Philipp Mueser & Phelps
attys.

UNITED STATES PATENT OFFICE.

THOMAS M. NORTH, OF BROOKLYN, NEW YORK, ASSIGNOR TO ROBERT HOE,
THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF NEW YORK, N. Y.

AIR-CUSHIONING DEVICE FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 600,164, dated March 8, 1898.

Application filed December 26, 1895. Serial No. 573,299. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. NORTH, a subject of the Queen of Great Britain, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Air-Cushioning Devices for Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to air-cushioning devices which operate to control the suspending or arresting of the movement of the reciprocating bed of a bed-and-cylinder printing-machine at the end of its stroke.

The object of the invention is to provide an improved safety or relief valve construction for such air-cushioning devices which is controlled by the connecting and disconnecting of the press to and from the driving-shaft, so as to permit the relief-valve to open at a lower pressure when the bed is released from the driving-shaft.

The invention consists in the construction and arrangement of the valve, as is herein-
after fully explained and claimed.

A practical embodiment of the invention is illustrated in the accompanying drawings, wherein—

Figure 1 represents a side elevation, partly in section, of so much of a bed-and-cylinder printing-machine as is necessary to illustrate the same. Fig. 2 is an end elevation thereof as seen looking in the direction of the arrow 2 in Fig. 1. Fig. 3 is an enlarged longitudinal sectional elevation of one of the air-cylinders with the piston at one end of its stroke; and Fig. 4 is a similar view of a portion of the same cylinder, showing the piston at the other end of its stroke. Fig. 5 is an elevation, partly in section, of the relief-valve mechanism; and Fig. 6 is a plan view of the relief-valve.

The printing mechanism shown consists of a revolving impression-cylinder A and a co-operating reciprocating type-carrying bed B, the means for operating this printing-couple being omitted as unnecessary, it being understood that the improvements herein contained are applicable to any printing-machine having a reciprocating type-carrying bed.

In the practical embodiment of the machine shown the bed B is illustrated as provided with four air-cylinders, two of the four, as seen from the side of the machine, being shown in Fig. 1 and marked, respectively, 2 4, and two at the end of the machine, being shown in Fig. 2, the same being marked 2 3. These cylinders are supported by the framework, as is usual, and have their mouths or open ends pointing toward the center of the machine, so that the same may receive the pistons 1, which are rigidly attached to the bed, travel with the same, and enter the open end of the cylinder at each end of the bed and move therein, compressing the air to afford resistance, which aids in bringing the bed to a stop, as is common and well understood.

The air-cylinders are provided with improved valves, which are so constructed that they will normally stand open and yet may readily perform their function of closing the cylinders. Referring more particularly to Fig. 3, these air-cylinders will be found provided at their outer ends with a head 10, centrally perforated with an air-passage 11 and having a central interior projecting pipe whose inner face is cut at an oblique angle to form the valve-seat. A rib 12 along the upper portion of this central projection affords a hanger for the valve proper, which is a circular plate 13, faced with a leather packing 14, said plate 13 having a lever 15 connected with it at such an angle that this lever 15 bears upon the inner projection 11, so that the valve pivoted at 16 to the rib 12 will hang and rest in the position shown in Fig. 3 or be lifted and closed, as in Fig. 4.

In Fig. 3 the piston 1 is just entering the cylinder 2, moving in the direction of its associated arrow, at which time the flap-valve is, in consequence of its gravity, hanging so as to open the aperture 11.

In the ordinary course of the operation of the machine, when the same is running at speed, the bed will carry this piston 1 rapidly into the cylinder 2, and, compressing the air therein, will force the flap-valve closed, so that a continuously-increasing and higher pressure of the air condensed therein may be exerted against the movement of the bed. By this simple structure the parts may be

turned over by hand in making ready, &c., at a low speed, which will not move the piston 1 rapidly enough into the cylinder 2 to cause the flap-valve to close, and hence any moderate pressure of air within the cylinder will not be sufficient to obstruct the ready movement of the machine by hand.

The air-cylinders are provided with a safety or relief valve embodying the present invention, as follows: Between the head of each cylinder and the inward point thereof reached by the piston in its stroke, as seen in Fig. 4, each cylinder is provided with a pipe 20, that leads to a relief-valve, which is provided with a weight capable of adjustment to determine the pressure at which said valve shall open. In this embodiment of it said valve consists of a head 22, provided with a cushion 25, a stem 21, and wings 23, by which it is guided vertically. This stem 21 rests upon a lever 27, whose pivot is in an arm 24, projecting from one side of the pipe 20, and upon the long arm of this lever there is arranged a sliding weight 26. By setting this weight 26 at any suitable position upon the lever 27 its pressure resisting the opening of the valve 22 may be increased or diminished, as desired, and hence the pressure of the compressed air in the air-cylinders necessary to move the lever and thus open the relief-valve is determined and may be regulated.

Herein the weight 26 is attached to the belt-shifter 40 by means of an arm 41, pivoted to an arm 42, that, through a rock-arm 8 and rod 43, is pivoted to said shipping-lever 40. In Fig. 2 the shipping-lever is thrown to carry the driving-belt 50 onto the loose pulley, at which time the machine will stop. As that arrangement is advantageous, the adjustment of the weight 26 with respect to its carrying-lever 27 may be made by a means for adjusting the rod 41 in its connection with the arm 42, so that the desired relation of the weight 26 on the lever 27 may be had when the machine is operating and said weight be drawn near to the pivot of the lever 27 when the machine is to be stopped, the desired pressure against the opening of the relief-valve being

thus maintained when the machine is running and that pressure minimized when the machine is to be stopped.

When in the ordinary operation the machine is suddenly stopped by moving the belt-shifter to throw off the driving-belt, the bed will continue to travel by reason of the momentum of the moving parts, thus causing the plungers to enter the air-cylinders at such speed and with such force as to compress the air therein to such an extent as to cause the bed to rebound, which action frequently makes the machine break down. To avoid this, the structure connecting the weight 26 with the shipping-lever is advantageous, since when the shipping-lever is moved to stop the machine it withdraws said weight to a position on the lever 27 which causes it to exert the least resistance to the opening of the relief-valve, and hence adapts the air apparatus at such a time to the easy stoppage of the movement of the bed. In practice this sudden stoppage of the machine when necessary from any cause and performed by the movement of the belt-shifter frequently takes place when the bed is near the end of its stroke with the piston 1 in the cylinder, thus making it necessary in order to protect the machine from damage that the air-pressure shall be immediately relieved.

What is claimed is—

The combination with an air or cushioning cylinder for the piston of a reciprocating bed, of a relief-valve connected by a pipe to said cylinder, said valve being seated upon a lever provided with an adjustable weight that is connected with the shipping-lever of the machine whereby it is moved on the lever on which the valve is seated, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS M. NORTH.

Witnesses:

F. W. H. CRANE,
E. L. SPEIR.